

## Magnetic Fusion Energy Moving Ahead Too

They call it "the other fusion."

Out in their new facility in Area III, Wilhelm Gauster and his colleagues in Fusion Technology Division 6248 are doing their pioneering part to pave the way toward prospective fusion energy.

But it's ironic. At Sandia, when you mention fusion, it's ICF (inertial confinement fusion) that usually comes first to mind. After all, Sandia has the world's most powerful particle beam fusion accelerators (PBFA-I and now the new PBFA-II).

But in most parts of the country, and of the world, fusion first calls to mind the magnetic confinement variety. Magnetic confinement fusion has been actively pursued for more than a quarter of a century, and a whole succession of research machines has been built at laboratories in the U.S., Europe, the USSR, and Japan. To many, fusion *means* magnetic confinement fusion.

So much so that when President Reagan and Soviet Secretary General Gorbachev stressed the importance of active international cooperation in developing controlled fusion for peaceful purposes, in their statement at the end of the Geneva Summit (see "Fusion at the Summit"), no one bothered to point out that they were referring not to ICF, which has military applications, but to magnetic fusion.

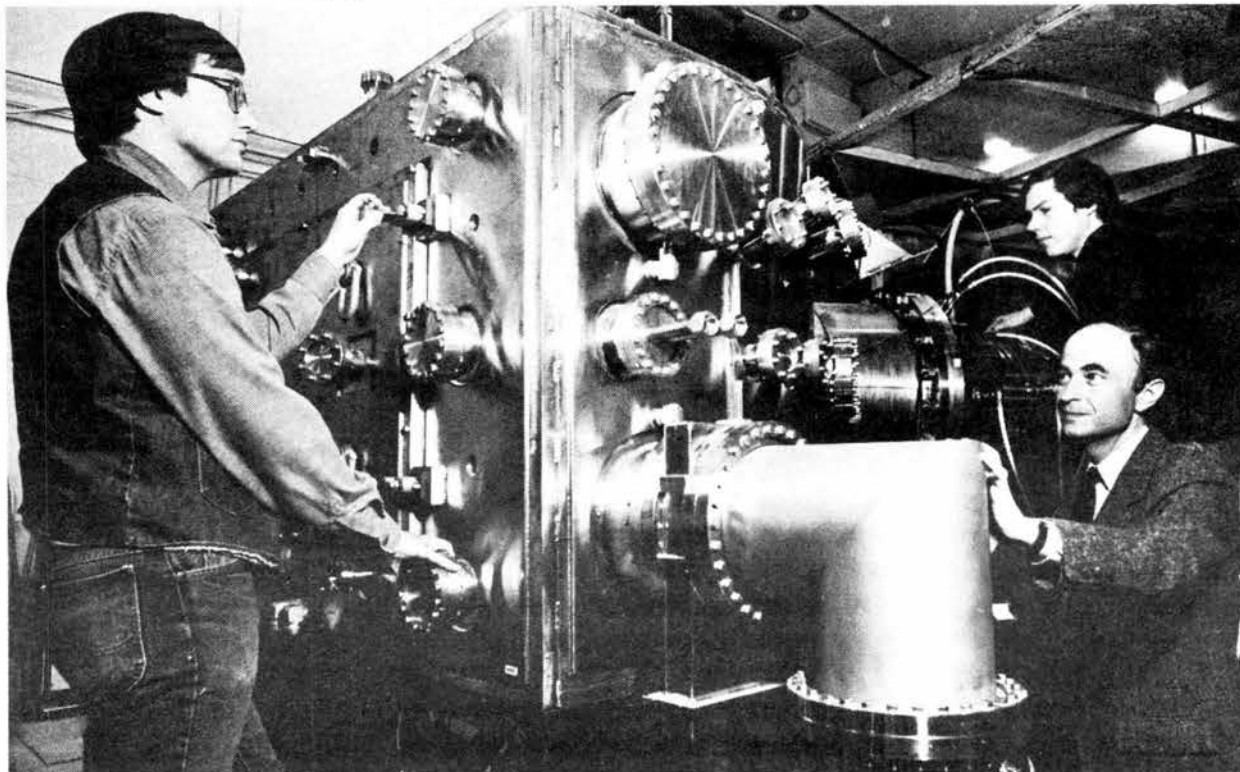
The statement heartened the fusion community. Gauster's group was no exception. "To build a tokamak that can be ignited is a gargantuan challenge," says Wil. "It takes a concerted national effort, so it makes sense to consider a concerted *international* effort. We're already heavily involved."

For the fact is, Sandia has a very active program in magnetic fusion energy. Its new test facility has been providing new data for a year and will become fully operational only next month. And Sandia is collaborating with most of the major fusion research centers worldwide, including the Tokamak Fusion Test Reactor (TFTR) at Princeton, TEXTOR in West Germany, the Joint European Torus (JET) in England, and the TORE-SUPRA facility in France. Sandia has been asked to strengthen collaboration with Japanese groups, including the group that operates the world's largest tokamak, JT-60.

Sandia's Magnetic Fusion Energy people are busy carrying out applied research on plasma materials interactions, materials development, and heat removal technology. They are doing engineering research on impurity-control components. And they have test facilities to carry out all of these goals.

"We have a corner on one specialty — plasma materials characterization and high-heat-flux problems," says Wil. "We have become very active. It's a small effort, but it has very high visibility. Our people are involved in research all over the world."

And it's a crucial role. The engineering of fusion research machines and of any future fusion power reactors requires solving complex technological problems in materials. The plasma must be kept from



IN THE PMTF (Plasma Materials Test Facility), this ion beam source is used to test the response of first wall and limiter materials to the kind of heat pulses they would encounter in a magnetic fusion reactor. With supervisor Wil Gauster (right), are John Whitley (left) who designed the facility at the vacuum chamber and Jon Watkins (rear), who worked on the development of the powerful new ion beam system. All are in Fusion Technology Division 6248.



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interacting with the walls of the fusion machine in deleterious ways. The heat transferred from the edge of the sun-hot plasma to the machine's internal components must be carried away efficiently.

Much of this work is carried out at Sandia Livermore, in Walter Bauer's Physical Science Department 8340, principally in Ken Wilson's Physical Research Division 8347. There Sandians do research on implantation of helium and hydrogen, on

carbon technology, and on tandem mirrors. Additional work is performed in Paul Peercy's Ion Implantation and Radiation Physics Research Department 1110. That group is studying surface interactions, using ion-beam accelerators and Sandia's nuclear microprobe. Mark Davis's Metallurgy Department 1830 is a major contributor in studying fusion materials.

The research activities in these three departments were the start of Sandia's Magnetic Fusion Program, and the work of Wil's group is closely tied to them. The materials work led to Sandia's being asked to sponsor the most recent International Conference on Fusion Reactor Materials held in Albuquerque in 1984.

The new Plasma Materials Test Facility (PMTF) in the northwest corner of Area III is open to non-cleared visitors, so scientists from other laboratories in the U.S. and abroad can easily come and go. In fact, two fusion researchers from West Germany have been working at the facility for some months. One, Josef Bohdanský, from the Max Planck Institute for Plasma Physics in Garching, West Germany, completed his research and returned home before Christmas. The other, Jochen Linke, from Kernforschungsanlage, Juelich, is in a research program that will continue into spring.

"We [Sandia] welcome collaboration," says Wil. "We work with many organizations. The problems of fusion technology are so challenging that the cooperation of people and groups worldwide is essential."

(Continued on Page Four)

### Fusion at the Summit

The final paragraph of the official joint statement issued by President Reagan and Soviet leader Gorbachev at Geneva in November advocated fusion cooperation:

"The two leaders emphasized the potential importance of the work aimed at utilizing controlled thermonuclear fusion for peaceful purposes and, in this connection, advocated the widest practicable development of international cooperation in obtaining this source of energy, which is essentially inexhaustible, for the benefit of all mankind."

The President followed this up in his televised address to the nation: "As a potential way of dealing with the energy needs of the world of the future, we have also advocated international cooperation to explore the feasibility of developing fusion energy."



## Bonner Named Personnel Director

Ralph Bonner has been named Director of Personnel 3500, effective Feb. 1. He replaces Herb Pitts, who became Director of Information Services 3100 on that date.

A native of Albuquerque, Ralph joined Sandia in January 1967 as a staff member in the auditing organization. In 1968, he transferred to the Benefits Department, where he had responsibility for administration of the retirement plan. In 1974 he moved to Management Staff 400. The next year he was promoted to supervisor of Benefits Administration and Employee Services Division 3543. In 1979 he became Assistant to Vice President 4000 (now 1000), and was promoted to Assistant to Executive Vice Presidents in July 1982. The following year he transferred to Auditing Department manager. Since January 1985 he has been manager of the Budgeting and Financial Management Department.

He has a BA in accounting and an MBA from UNM.

Ralph enjoys running and downhill skiing, and is active in his church. He and his wife Patsy have two children and live in the SE Heights.



RALPH BONNER (3500)

## Take Note

LAB NEWS has extra copies of the special issue, the one with the "State of the Labs" and the 1985 Technical Accomplishments. If you want one or more, come by the LAB NEWS office in Bldg. 814.

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It's Valentine's Day — do something for your sweetheart, do something for your own heart. That latter something could well be to participate in Presbyterian Hospital's "Be Good to Your Heart" program. Heart Fairs, where you can learn more about your heart health risks and how to lower them, will be held from 7 a.m. to 4 p.m. on the following dates and places:

Feb. 14, 15	Presbyterian Hospital Lobby
Feb. 17	Northside Pres. Hospital Lobby

Feb. 21

Kaseman Pres.  
Hospital Cafeteria

In addition, an education series featuring Pres. physicians is set for Feb. 17 and 18 in the Hospital Cafeteria. Seating is limited, and advance registration is required; call 841-WELL.

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The February meeting of the Project Management Institute, Rio Grande Chapter, is Feb. 19 at the AMFAC Hotel. A workshop is at 5:30 p.m., dinner at 6:45, and program at 7:45. The speaker, Dennis Roberts of Associated General Contractors, will discuss "The Effects of Labor Relations in Project Management." Cost is \$13 if pre-registered, \$15 at the door. More info from Jim Furaus (7866) on 4-7511.

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Black History Month is being celebrated on KAFB. On Feb. 21, James Lewis, NM State Treasurer, will speak on "Blacks in Politics" in the Que Pasa Rec Center at 7:30; on Feb. 23, the East Chapel holds a family gospel service from 2 to 5 with a reception following; and on Feb. 25 the film "Harriet Tubman and the Underground Railroad" will run at the Que Pasa at 7:30. The public is invited to all events.

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A reminder: Many KAFB facilities — gym, Que Pasa, Thrift Shop, etc. — that were once open to Sandians, DOEans, and dependents are now closed except to those who have purchased an MWR (Morale, Welfare, Recreation) card; the cards are \$24 per year (prorated) and may be purchased at the Que Pasa Rec Center. (Retirees are no longer eligible to use any Base facilities.)

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Texas Exes (that is, U of T alums) are invited to the annual get-together. And, boy howdy, it's special this year. Margaret Berry, UT historian and author of *U. T.* —

## Livermore Take Note

Paul Klevgard (8186) delivered a paper, "Precision Volume Measuring System," at the 1986 Measurement Science Conference in Irvine, Calif., and was awarded the top prize for best paper out of the 55 given at the conference. Paul received a plaque and a \$300 honorarium. His paper discussed an engineering study done to calibrate and certify a precision volume measurement system that uses the ideal gas law and precise pressure measurements to determine the ratio of a known to an unknown volume.

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Marlin Pound, supervisor of Physical Security Division 8261, has been elected vice-president of the California Association for Recreation & Park Insurance. He has been a board member of the Livermore Area Recreation & Park District for the past 18 years and helped found the state insurance group in 1982. He is also a founding member of the California Association of Park & Recreation Commissioners, and has served on the National Recreation & Park Association as the California representative.

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Barry Schrader (8201) received the Livermore Chamber of Commerce "1985 Outstanding Community Service Award" at the Chamber's annual dinner meeting Jan. 25. He was honored for many years of volunteer work in Rotary, scouting, historical societies, the valley mental health advisory committee, rodeo and fair parade chairmanships, and the vineyard preservation movement, which he founded in 1981.

*Traditions and Nostalgia* will leave the Lone Star state just to speak at the shindig. It's March 1 at 6:30 p.m. at the El Patron Restaurant, and it's \$9 a head. Make reservations by Feb. 24 with Karen Grube (4-4478) or Bill Tedeschi (6-7969).



It's science fair time again, and local schools need help judging. Here are a few opportunities for employees (A269 time may be charged for fair judging), retirees, and family members. If you would like more information, call Karen Shane (4-3268).

**BERNALILLO JUNIOR HIGH AND HIGH SCHOOL** district fairs on Thursday, Feb. 20, 1 to 3 p.m., and Thursday, March 6, 11 a.m. to 1 p.m. Lunch will be provided.

**TAYLOR MID SCHOOL** in the north valley, Thursday, Feb. 27, 7:30 a.m. to 2:30 p.m.

## LAB NEWS

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## Cain Looks Back 30 Years

When Sandia Livermore reaches its 30-year mark next month, only one of its nearly 1100 employees can claim to have been there since Day One — Gayle Cain, supervisor of Test Projects Division 8182.

Actually, Gayle predates the official March 8, 1956, starting date by several months. He was first interviewed for a transfer to Livermore in the fall of 1955. He liked what he saw, so he went back to Albuquerque, packed up his wife, Wanda, and two daughters, plus a pet chicken, and drove them out to Livermore via Las Vegas in their 1949 Chevrolet (which he still has



stowed away in his garage). They were first housed in a company-provided duplex at 242 North K St. as he began work in barracks quarters (Building 155 west of the LLLRA pool) on Oct. 6, 1955.

Gayle's career with Sandia had begun three years earlier on Dec. 29, 1952 when he left "a drab and dreary winter in Milwaukee for bright and sunny New Mexico," as he puts it. He had been working in that upper midwestern city for three years after graduating from Oklahoma A&M with a BS and MS in electrical engineering. His first Sandia assignment was to evaluate the impact fuzing systems on the Honest John and Corporal missiles.

The Cains found a nearly new house on Harvard Way in early 1956 and bought it — one of only two on the market at the time in the whole town! With tax and interest, payments were \$64 a month. They still live there 30 years later.

Gayle's initial work in the LLNL barracks was to assist an LLNL nuclear engineer who was fielding a device in the Red Wing series in the Pacific. "That job was the closest we've ever worked with Lawrence people on a day-to-day basis, probably because we were such a small group and didn't have programs or a lab of our own," Gayle recalls.

After moving to another LLNL barrack (Bldg. 136 — the pink one) for a few years, Gayle finally got to locate at Sandia — in the southwest corner upstairs of the new Bldg. 912. It wasn't long after that he became a section supervisor in Environmental Test Division II.

His recollections cover many of the early projects on which Sandia and Lawrence worked closely together — the Davey Crockett recoilless rifle, the Little John missile, and more. Gayle feels that LLNL

designers in the early days were considered much more radical than their counterparts at Los Alamos, but the LLNL designers were given more latitude to create concepts. "The Atomic Energy Commission was much less involved with our day-to-day operations in those times, and budget controls were not as stringent as today. We didn't have to justify every detail of our work from here to Congress," he adds.

On July 3, 1967, Gayle nearly lost his life. He and several other Sandians were checking out an electrical device designed to generate high loads for testing components in Bldg. 914. It blew up near him, knocking a hole in his forehead and giving him a severe skull fracture. He was hospitalized for weeks and didn't return to work fulltime until that October.

Gayle believes that the biggest change through the years is how Sandians work with computers. And he feels that the transistor has had the greatest impact. "Going from tubes to transistors just turned the telemetry business upside down. The size of devices was reduced manyfold. Now, a pocket calculator can accomplish what one of our bulky early computer systems did. And there's a big savings in time and cost — we can test a missile six or seven times in the field and collect all the data now; it took

up to a hundred tests in the old days before computerization."

Looking ahead, Gayle thinks Sandia should be further into "smart weapons" research. "We should be playing a bigger role in this area, given the technical capabilities available to scientists here," says Gayle. "Both artificial intelligence and fifth-generation computers are other areas worth pursuing."

What will he do when he finally decides to retire? "Even though we came to California thinking it would only be a temporary move from Albuquerque, we now realize we are true Californians," Gayle admits. "When we visit family in Oklahoma or in other parts of the country, they just seem to act and live differently. I'll retire right here in Livermore. I've got to fix the brakes on that '49 Chevy, the one my wife and two daughters learned to drive in. And the upholstery needs replacing, and then there's the garage to clean out . . ."

But he isn't ready to retire just now. In fact, he's looking forward to another office move inside Bldg. 912 where he started so many years ago. This time, however, although the office won't be any larger, there'll be a new carpet on the floor to go along with the new shade of paint on the walls!



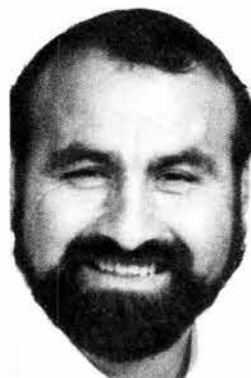
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### Supervisory Appointment



ANDY CARDIEL to supervisor of Machine Shop Section 8184-1, effective Feb. 1.

Andy came to Sandia Livermore as a bench and machine operator in 1965 after two years in the U.S. Army. Shortly thereafter, he entered

Sandia's four-year Machinist Apprenticeship program and took his class work at Chabot College. After completing the training program he became a precision experimental machinist.

His education includes an AA degree in Machine Tool Technology from Delta College in Stockton. He has been active in the International Association of Machinists Local No. 284 for the past 20 years.

Andy used to be an active skier and downhill racer and belonged to the LLLRA Parallelers Ski Club, but since he moved into a new home in Pleasanton a year and a half ago, his spare time has been spent in landscaping and in finishing his garage. He and his wife Dorothy have a two-month-old baby boy and another son at home.

### Congratulations

Barbara (8022) and Frank Zaragoza, a daughter, Kara Rose, Jan. 25.

### Sympathy

To Carl Pretzel (8473) on the death of his infant daughter in Castro Valley, Jan. 23.

To Cliff Skoog (8266) on the death of his mother in Dorris, Ca., Jan. 29.

To Cook Story (8316) on the death of his father in Ohio, Jan. 25.

### Retiring



JAY JOST and CLARENCE JOHNSON (Both 8184)



## Fusion

Wil himself serves on a 25-member DOE panel mapping out fusion goals through the year 2000. He is also involved in a panel for the International Energy Agency to try to coordinate fusion materials programs worldwide. "The U.S. is looking to integrate its efforts into the world programs," says Wil. "Our TEXTOR effort is sort of a model for cooperation."

The PMTF is a key Sandia laboratory because it's an integral part of the international effort to develop internal components for magnetic confinement fusion. "We expect PMTF to play an important role in that worldwide research activity," says Wil. "In fact, it already is doing so."

The PMTF (see PMTF story) unites into one package Sandia's experience in 1) trying to understand the physics of the interactions of plasma and materials, 2) development of specialized materials for use in magnetic fusion, and 3) design of high-heat-flux components for fusion machines. "Sandia is unique in combining expertise in these three areas," says Wil. "Our strength is based on the combination of activities in the 1000, 8000, and 6000 organizations."

The facility can subject in-vessel components to conditions similar to those they would encounter at the edge of the plasma in a working fusion energy reactor. Among such components are limiters, devices that shape the plasma's outer edge, and advanced limiters, which include pumps that control plasma density and remove impurities. Other components to be tested include magnetic divertor targets, actively cooled radio-frequency antennas, and beam dumps (thick armor to protect the walls of a fusion machine from injected neutral beams used to heat the plasma).

### First Time Possible

## PMTF Tests Full-Sized Components

Sandia's new Plasma Materials Test Facility (PMTF) contains three main apparatuses and their associated computer systems: a workhorse electron-beam accelerator (moved from its prior location in Bldg. 805) used for a wide variety of materials studies; a high-velocity plasma spray machine, operated by Mark Smith (1834), that can quickly deposit thick coatings of compounds onto a material (LAB NEWS, May 27, 1983); and a new and powerful ion beam test system.

This new ion source and power supply will deliver as much as 0.8 megawatts of power (40 kilovolts at 20 amps) to a large (59 cubic foot) test chamber. The back side of the chamber has a 2 x 3-foot opening for insertion of large test samples.

This allows full-sized versions of components that might be used in a fusion machine to be exposed to a high heat flux for thermal fatigue tests — the first time that has been possible. "It should be able to handle any kind of target that designers can come up with," says PMTF's Jon Watkins (6248). Its 9-inch-diameter beam of hydrogen ions hits the

sample and very quickly heats it — to failure if desired — to simulate the high heat flux seen in a tokamak fusion machine. The graphite surfaces in a tokamak are subjected to temperatures of 1200 to 1500 C during normal operation; during an anomalous event they might reach 3000 degrees.

The power supply for this ion source has now been installed, and the machine will produce its first beam this month. "So this third and final portion of the PMTF is becoming operational," says John Whitley (6248), PMTF principal researcher; John developed the proposal for the facility several years ago.

"Operation of the power supply is a milestone representing the completion and full operational status of the PMTF," says Wil Gauster. "Several dedicated people in 6248 deserve mention here, including Jimmie McDonald, for coordinating the entire construction effort; Jim Banks, for the vacuum system and ion source; Neill Gilbertson, for the high-voltage power system; and Tom Lutz, for the computer control and data acquisition system."

"Our facility is now open and functioning," says Wil. "And our activities are growing and thriving."

One of the big projects in the Division right now is about to go into production. It is the Advanced Limiter Test II (ALT-II) limiter (see ALT-II story), a large belt limiter designed to go inside the TEXTOR fusion machine in Juelich, West Germany, in early 1987. TEXTOR is a tokamak designed especially to study interactions be-

tween plasma and a fusion chamber's wall.

(Tokamaks are the leading machines for magnetic fusion. They are toroidal, or doughnut-shaped, fusion machines that use a combination of two magnetic fields to confine and stabilize the plasma. They were first developed in the Soviet Union but were quickly picked up by researchers worldwide.)

ALT-II will extend all the way around  
(Continued on Page Five)

## ALT-II: Major Step Toward Fusion Machines

Sandia's Advanced Limiter Test II (ALT-II) project represents the first attempt at building and using a full toroidal belt pump limiter. Detailed design and fabrication have begun at the Plasma Materials Test Facility. Japan and West Germany are also making portions of the limiter. Installation in the TEXTOR tokamak in West Germany and the beginning of experimental operation are scheduled for early next year.

Rather than a module inserted through a port into the tokamak (as was ALT-I), the ALT-II limiter is a thin curved blade 11 inches wide that will run the full circumference of the TEXTOR torus, inside the outer wall of the chamber. Plasma particles will be collected beneath the blade and channeled out through pump ducts.

ALT-II is to be a reactor-relevant configuration," says Joe Koski, coordinator of the ALT-II project. "Wherever possible, its design simulates the future design of power-producing tokamaks."

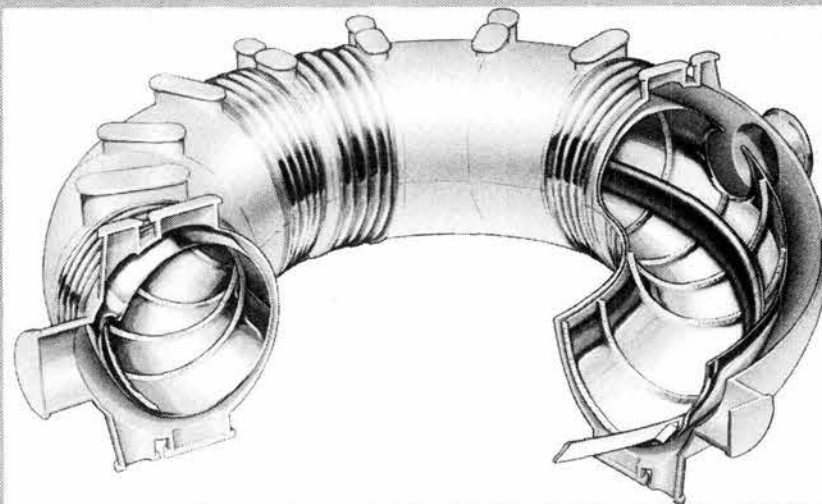
To remove excess helium ("ash"), ALT-II will be required to exhaust 5 to 10 percent of the plasma particles, which, in the process, will remove approximately 200 watts per square centimeter of heat flux on the limiter face. It must be able to

operate through the summation of many 3-second tokamak pulses for a variety of plasma conditions, including auxiliary heating by ion cyclotron resonance and neutral beams.

The first prototype blade will be made from a high-strength stainless steel body covered by 2-cm-thick graphite armor tiles. This part of the structure will be built in Japan, but the design is based on detailed thermo-mechanical response calculations by Bob Watson and modeling of plasma edge behavior by Bob McGrath (both 6428). The principal items of hardware that are Sandia's responsibility are the movable support structures, designed

by Gary Brown (6248) and Ben Tafoya (on loan from 2853). Gary is carrying out an extensive test program on high-temperature, high-vacuum mechanical components. The complex vacuum and gas injection system was designed by Mike Malinowski (8347); it is also a key element for the diagnostics of pump limiter performance.

ALT-II is a prototype of limiters for future magnetic confinement fusion reactors. "We expect the ALT-II program to provide definitive answers to many crucial materials, engineering, and physics problems for other fusion devices," says Wil Gauster (6428).



ALT-II LIMITER designed at Sandia is currently under construction in Japan and West Germany. This cutaway view is an artist's conception that shows (at right) the limiter as a curved blade covered with graphite tiles inside the torus- (or doughnut-) shaped tokamak.



## Fusion Moves Ahead

the interior vessel of the machine. "We're coordinating the engineering design of ALT-II, with Joe Koski of our group leading an international team," says Wil. In fact, Sandia is coordinator of both the previous, smaller ALT-I and current ALT-II programs. Both are cooperative international test programs in fusion energy and materials technology.

After two years of planning, design, and experimentation, hardware for ALT-II is now being constructed. "Some of the parts are being made here at Sandia, some in Japan, and some in West Germany," says Wil. "This in itself has been quite a feat of coordination."

Wil's group has also recently begun designs of a pump limiter for the TORE-SUPRA, the large tokamak in France, scheduled for completion in 1988.

The group has already built and tested a beryllium limiter for the ISX-B, an experimental tokamak at Oak Ridge. Beryllium limiters for JET at Culham, England, and carbon/carbon composite limiters for the TFTR at the Princeton Plasma Physics Laboratory are scheduled to undergo studies at Sandia this year.

The Sandians have also been asked to

look ahead and analyze what kinds of materials and cooling designs will be needed by the international magnetic fusion program in the future. They will build and test in the PMTF small prototypes of the designs.

"Also, we've been asked to work with the confinement labs to design and build *real* plasma-interactive components, full-size ones that will actually be used in fusion machines," says Wil. "Depending on what materials combinations you use, you will get different lifetime limitations and performance characteristics. We'll work with the confinement labs to design and build the hardware to be installed in fusion machines and then go there to participate in the tests."

The Sandians will do both heat flux testing in the Lab and build and install components for tests in fusion machines.

In all these efforts Wil's group has adopted an orderly research philosophy. "We intend to proceed in an evolutionary way, to work with existing materials to get information to design an eventual power-producing fusion reactor. That is the goal we all seek." • Ken Frazier (3161)

## A Fusion Primer

Nuclear fusion, the major energy source in stars, means the joining (or fusing) of the nuclei of light atoms in order to form heavier ones. The process releases only a fraction of the very large "binding energy" of the nucleus. But it's enough energy to make a thermonuclear weapon the most powerful in existence.

And it's energy that could be used, someday, to create the heat needed to drive a generator. Fusion power would be a safe, clean, and abundant form of energy.

But the physics problems that must be solved first are formidable. The light nuclei that could be fused are positively charged, so they repel one another strongly. Fusing them means slamming them together at very high velocities.

Such velocities can be created by heating the nuclei, in the form of a gas, to very high temperatures (on the order of 100 million Celsius). At such temperatures, the gas becomes ionized — the electrons that revolve around the ion (the nucleus) become freed from it. So a gas that is fully ionized is an electrically neutral mixture of freely moving ions and electrons, or a plasma (sometimes called "the fourth state of matter" to distinguish it from solids, liquids, and gases).

But simply creating a plasma is not enough to ignite a fusion reaction; most of the time, when the nuclei slam into each other, they simply bounce off. The plasma has to be held together — confined — long enough to force the nuclei to collide the billions of times necessary to induce fusion.

That's not easy. It means producing and heating a plasma fuel of sufficient density (some  $10^{14}$  nuclei per cubic centimetre) to thermonuclear temperatures, then confining it long enough to produce

more fusion energy than was expended in heating and containing it. These two requirements are often quantified by a mathematical relation called the Lawson criterion.

The most likely fusion fuels are hydrogen and/or its isotopes, deuterium and tritium. Fusing the latter two produces helium plus an energetic neutron, which creates 17.6 MeV of energy. A thimbleful of deuterium would release as much energy from fusion as the combustion of 20 tons of coal. The natural deuterium contained in one litre of water would produce the fusion energy equivalent of 300 litres of gasoline.

In the magnetic confinement approach to fusion, a deuterium-tritium plasma is suspended inside a "magnetic bottle," which contains the plasma within strong magnetic fields. Such containers can be either open (or mirror) systems or closed systems. Currently, the most promising system is a closed one, the doughnut-shaped tokamak (a Russian acronym for "toroidal chamber, magnetic"). Within a tokamak, a hydrogen-deuterium plasma fuel (someday tritium-deuterium) is heated by any of several methods. Once research progresses enough to allow the fuel to be ignited, a self-sustaining, steady-state fusion reaction will occur.

In the inertial confinement approach, a deuterium-tritium fuel pellet is compressed by the implosion created when its outer layer is made to explode when zapped with laser beams or, in the Sandia case, charged particle beams. Again, the Lawson criterion must be met — the implosion must heat the pellet for a long enough time to fuse the nuclei. To be useful as a source of energy, the fusion reaction would occur as a series of pulses.

## Woman of the Year

### Sandian Receives Award From Pilot Club

Technician Judy Tripp of Test Data Analysis Division 7522 was named handicapped Professional Woman of the Year recently by the Pilot Club of Albuquerque. She received a recognition trophy from the club on Jan. 28, and will now be the local club's candidate in Southwest District competition.

The district winner moves on to the Pilot International Awards Program, which includes winners from Canada and the United States.

The award is based on community activities, occupational achievement, nature and severity of handicap (and how one deals with it), education, training, and experience.

Judy was born hearing-impaired and spent time at several schools learning to speak and to use sign language. She's turned it around now, and spends many hours teaching sign language at Sandia and other places in the city.

She joined the Labs in 1962 as a teletype operator. "I've moved around a lot," she says. "I was a microfilm clerk for a while, then moved on to the purchasing and salary administration organizations. I've been in my present division for about five years."

Judy is active in many community organizations, including the New Mexico and National Associations of the Deaf and the New Mexico Deaf Registry.

Pilot International recognizes the abilities and achievements of handicapped people during its annual convention, to be held this year in Washington in July.



JUDY TRIPP (7522), chosen handicapped Professional Woman of the Year by the Pilot Club of Albuquerque, teaches sign language classes at the Labs and at several other Albuquerque locations. Here, she works with some of her Sandia students.



## Supervisory Appointments

RON LIPINSKI to supervisor of Directed Beam Research Division 1274, effective Jan. 16.

Ron joined Sandia as an MTS in the Reactor Safety Theoretical Physics Division in November 1977. In 1984 he moved to the Directed Energy Physics Division, where he served until his recent promotion.

He has a BS in physics from CalTech and a PhD in nuclear engineering from the University of Illinois. He spent a year in a reactor safety group at Argonne National Laboratory before joining Sandia.

Ron is a member of the CAVE Research Foundation, which does surveys for the National Park Service at Carlsbad Caverns. He enjoys hiking, downhill skiing, and bird watching. He and his wife Therese have two children and live in the NE Heights.

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BILL FOY to supervisor of Photometric Operations Section 7556-1, effective Jan. 16.

Bill has been with the Labs since February 1951, when he joined the electromechanical assembly group in Field Test. From 1953-55 he was assigned to White Sands Missile Range, where he worked on FM telemetering and instrumentation for a weapon development group. When he returned to SNLA in 1955, he joined the photometrics organization, where he has been ever since, except for a two-year assignment in environmental testing to work on shock tube instrumentation. His photometrics work, mostly on high-speed and ultra-high-speed instrumentation, has taken him to many different locations, e.g., Johnston Island, Nevada Test Site.

He served for three years in the Navy (Seabees) during WWII, and is past commander of the local VFW post, in which he's been active for 15 years.

Bill and his wife Erma live in the NE Heights. They have four grown children.

\*\*\*

JIM SEARCY to supervisor of Exploratory Batteries Division 2523, effective Jan. 16.

Jim joined the Labs in September 1974 as an MTS in the Pyrotechnic Components Division. Three years later he transferred to the Atmospheric Research Division, where he conducted studies on the environmental impact of solar heating and cooling materials. He's been involved in battery research work since 1979.

He has a BS in chemistry from Lamar Tech (Beaumont, Tex.) and a PhD in physical chemistry from Purdue University. He also did postdoctoral work in chemical engineering at Yale University.

Jim is a member of the American Electrochemical Society. His spare time activities include gardening and camping. He and his wife Ursula have two children and live in the NE Heights.

\*\*\*

BILL HOLLIS to manager of Budget and Financial Planning Department 140, effective Feb. 1.

Bill joined the staff of Sandia's Auditing Department in August 1961. Over the next three years, he also worked in the budget and payment processing organizations. He left the Labs in 1964 to become a professor of accounting and management at Ft. Lewis College (Durango) for 11 years. After



RON LIPINSKI (1274) and BILL FOY (7556-1)



BOB MILLER (3426-1)

another four years in private business, he returned to Sandia in 1979 and worked in auditing, on special assignment to develop an accounting cost system for the Center for Radiation-hardened Microelectronics (CRM), and reimbursable accounting until 1982, when he was promoted to supervisor of the Financial Division at SNLL. He moved back to SNLA to head the Management Information and Results Division in 1984. Last November he transferred to the Contract Audit Division, where he was until his recent promotion.

He has both BS and MS degrees in accounting from Oklahoma State University. Bill is a member of the American Institute of Certified Public Accountants and the American Accounting Association. He received his CPA certification in 1961.

Bill likes to camp, fish and hunt. He and his wife Chris live in the NE Heights. They have two grown children.

\*\*\*

JIM GARRISON to supervisor of Financial Systems Design Division 2625, effective Feb. 1.

Jim joined the Labs as a staff member in the division he now supervises in December 1978. Two years later he transferred to Procurement Systems Design Division 2629. He left Sandia in May 1982 to become internal audit manager at Atari in Sunnyvale, Calif. Upon his return to the Labs in 1984, he worked in the Internal Audit Division. He's been assigned to the Procurement Systems Design Division since December 1984.

He received his BA in marketing and management from Phillips University (Enid, Okla.) and his MBA in accounting and information systems from North-

western University. He is a CPA and a member of the American Institute of Certified Public Accountants.

Jim is a board member at his church and is a coach and referee for youth soccer in his spare time. He and his wife Debby have three children and live in the NE Heights.

\*\*\*

BOB MILLER to supervisor of Custodial Section I 3426-1, effective Jan. 1.

Bob joined Sandia as a custodian in April 1974. Five years later he moved to the Storage Section in the Plant Services Department. He next worked in another group in the same department, the Nuclear Material Control Section, where he's been until his recent promotion.

He has taken business and police science courses at Illinois State University and the University of Miami.

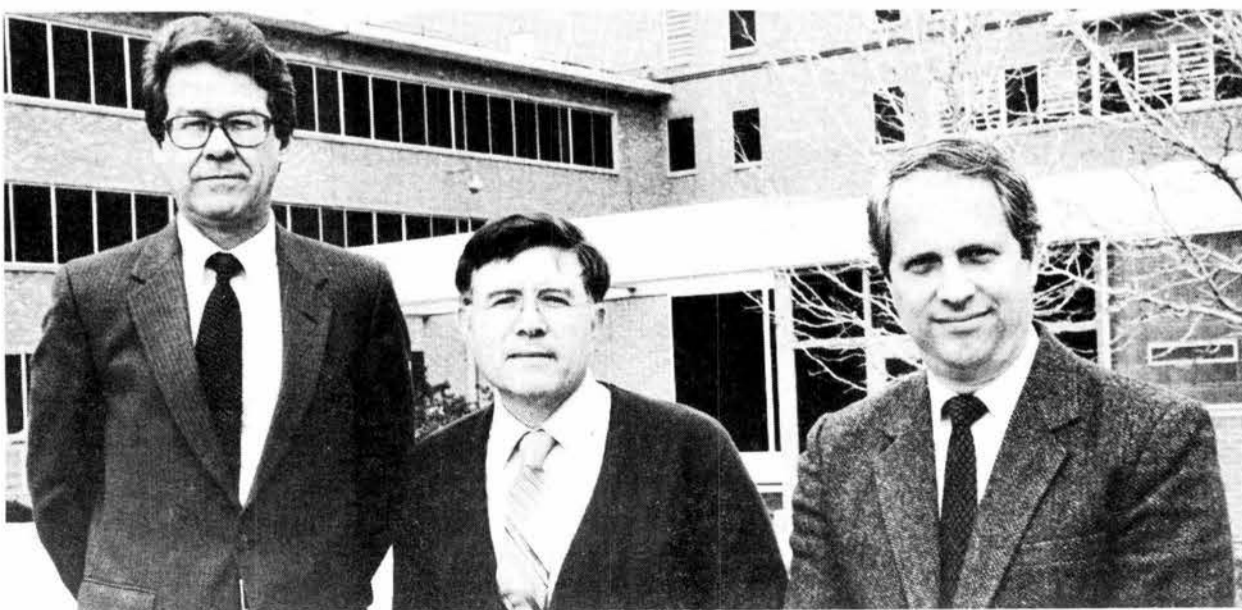
In his spare time, Bob investigates and collects historical data on the Old West from the 1880-1910 period. He combines this interest with another hobby — tracking (*not* hunting!) mountain lions.

Bob and his wife Ruth live in the NE Heights. They have two grown children.

\*\*\*

RUTH DAVID to supervisor of NTS Instrumentation Development Division 7121, effective Feb. 1.

Ruth joined Sandia in June 1975 after receiving her BS in EE from Wichita State University. She was an OYOC (One-Year-on-Campus) program participant during her first year at Sandia. She was assigned to a field test instrumentation group during her first summer at the Labs, and went on to Stanford University during the school year to earn her MS in EE. After returning



BILL HOLLIS (140), JIM SEARCY (2523), and JIM GARRISON (2625)



to SNLA, she again joined the field test group, where she worked on hardware design and signal processing. She was chosen for the Doctoral Study Program (DSP) in 1979, and went back to Stanford for two years to obtain her PhD, also in EE. She returned to field test in 1981, and has been in the division she now supervises for about three years.

She teaches INTEC courses in signal processing, and is co-authoring a book, *Signal Processing Algorithms*, with Sam Stearns (7111). Ruth is also an adjunct professor at UNM; this semester she's teaching a graduate class in digital signal processing. She's a member of IEEE.

Ruth lives in the NE Heights.

\*\*\*

DAN DOUGHTY to supervisor of Inorganic Materials Chemistry Division 1846, effective Feb. 1.

Dan joined the Exploratory Chemistry Division II at SNLL in November 1979. He has been with the same group until his recent promotion.

He has a BS in chemistry from UNM and a PhD in inorganic chemistry from the University of Minnesota. He's a member of the American Chemical Society.

In Livermore, his community activities included advising the high school youth group at his church. He enjoys camping, fishing, studying marine mammals, bird-

ing, and reading. Dan and his wife Christine have two children. Their home is currently in Livermore, though the family will soon be moving to Albuquerque.

\*\*\*

JENNIE NEGIN to supervisor of Systems and Appraisal Division 3463, effective Feb. 1.

Jennie joined Sandia in November 1975 as a staff member in the computing organization, where she designed a computerized radiation exposure badge system. She then transferred to the Material Systems Division to work on a nuclear materials control system. In 1980 she was assigned to the Personnel Data Division to set up a personnel node on the Administrative Distributed Network.

She has BS and MA degrees in mathematics from the University of Florida. Before Jennie joined the Labs, she worked in the computing center at that university and in the computer directorate at LANL. She also served as a computer consultant to the Law School and Maxwell Museum of Anthropology at UNM.

Jennie is a member of the Association for Computing Machinery and the NM Network for Women in Science and Engineering.

She is active as a volunteer in several community groups, and enjoys skiing and windsurfing.

## Fun and Games

**Skiing** — Rethink snow! The long awaited flakes have finally fallen and the New Mexico Multiple Sclerosis Society already is deep into plans for a statewide Ski Extravaganza. The event schusses off tomorrow (Feb. 15) at Red River, with Sandia Peak joining in on Feb. 22, Santa Fe on March 1, and Angel Fire on March 8. Lift tickets are free for ski-a-thon participants. Those who haven't yet packed their swimwear away for the winter should be glad to have a shot at the No. 1 prize; a trip to Jamaica for the top fund raiser. For more information, call Lorraine Jones at 888-4948 or 888-3044.

\*\*\*

**Bowling** — Entries for the Best Ball Tournament close today (Feb. 14) at noon. This is a three-game, couples-only event for SANDOE members and their guests. Let the pins fall where they may, a minimum of one prize for each six entries will be awarded. Squad time is scheduled for 1 p.m. tomorrow and on Sunday. Contact Fred Gunckel (2545) at 6-7235, or Dora Gunckel (6410) at 4-4052 for entry blanks.

\*\*\*

**Tap Dancing** — Fred Astaire and Ginger Rogers you're not, but here's an occasion to exercise with others who aren't, either. The Sandia Mountain Cloggers have a lot of great fun on tap with hillbilly dancing while shedding those pounds. A free class for beginners, five-years-old and up, is scheduled to start on Tuesday, Feb. 18, from 7 p.m. to 8:30 p.m. Fifteen more weeks of lessons at the University Heights United Methodist Church will cost adults \$2 each, children \$1. For further information, call Paul Beck (5311) at 4-7770 or Ruth Whitney at 296-5674.

### Congratulations

Debra Trujillo (5263) and Paul Faculjak, married in Albuquerque, Dec. 27.



RUTH DAVID (7121) and DAN DOUGHTY (1846)



JENNIE NEGIN (3463)

## Welcome

### Albuquerque

John Armijo (7813)  
Andrew Ashbacher (7811)  
Laureen Atencio (2831)  
James Bechdel (3155)  
Dennis Clingan (7485)  
Debra Clouten (3722)  
Margaret Crow (22)  
Dorothy Deininger (21)  
Larry Dresser (3722)  
William Gallegos (7813)  
Michael Gilbert (7485)  
Josephine Graf (21)  
Mary Gutierrez (22)  
Marijo Hinrichs (3544)  
Ronald Hoskie (7813)  
Daniel Hughes (7485)  
Don Hush (1623)  
Brenda Jensen-Sanchez (21)  
Rosalie Lopez (7475)  
Spencer Luker (6446)  
Charles Madole (3714)

Bruce McClure (133)  
Ruth Mitchell (22)  
Tim Mitchell (7485)  
Randy Montoya (3162)  
Thomas Mullen (133)  
Mariann Pilson (7485)  
Hugh Reilly (6227)  
Michele Robertson (2626)  
Donald Rhodes (7813)  
Robert Romero (7545)  
Michael Saavedra (7485)  
Edward Schaub (5341)  
John Scott (7843)  
David Toupal (7475)  
Maren Tracy (2147)  
Susan Trowbridge (2626)  
Robert Urias (7813)  
William Watkins (7222)  
Virginia Whelan (21)

### Arizona

Ray Finley (6313)  
Jeff Hollowell (5343)

### California

Wes Grammer (2345)  
Tim Sheridan (1253)  
Douglas Adkins (6227)

### Colorado

Carl O'Dell (2626)  
Raymond Rivera (3311)

### Florida

Frank Rojo (7475)

### Illinois

James Fanning (1234)

### Kansas

Catherine Carter (2641)  
Lonnie Haden (5238)

### Michigan

Michael Maurer (3732)

### Minnesota

Mark Schneider (7537)

### Missouri

Roger Vogel (2312)

### Nebraska

Daniel Rubin (5252)  
Douglas Weiss (2312)

### New Mexico

James Anderson (2311)  
Lynn Borkenhagen (3712)  
Tana Fallon (3732)  
George Gabaldon (7818)  
Miriam Leon (7475)  
Paul Montavon (7171)  
Michael Morrow (7475)  
Paul Mott (1823)  
Bernice See (22)  
Anthony Wagner (2631)

### New York

Irene Dubicka (3162)

### Pennsylvania

Robert Buckingham (5312)

### South Carolina

John Pletta (5263)

### Texas

Robert Habbit, Jr. (5313)  
Barbara Luke (6313)  
Charles Nuckolls (2311)  
Brent Sims (7525)



# ECP "Annual Report" 1985



ONE OF THE LARGEST INCREASES (21 percent) in 1985 United Way funding went to Family and Children's Services. Here, Herb Pitts (3100), 1985 ECP chairman, takes momentary charge of one of the Services' most cherished responsibilities, a soon-to-be-adopted infant. Of the funds raised through ECP, some \$995,000 went to United Way agencies and the UW Grant Program (which includes the American Heart Association, the Arthritis Foundation, the Cystic Fibrosis Foundation, the Easter Seal Society, the Multiple Sclerosis Society, and the National Kidney Foundation). And about \$82,000 went to organizations designated by Sandians under the Donor Option plan. Some 7 percent of ECP contributors used Donor Option.

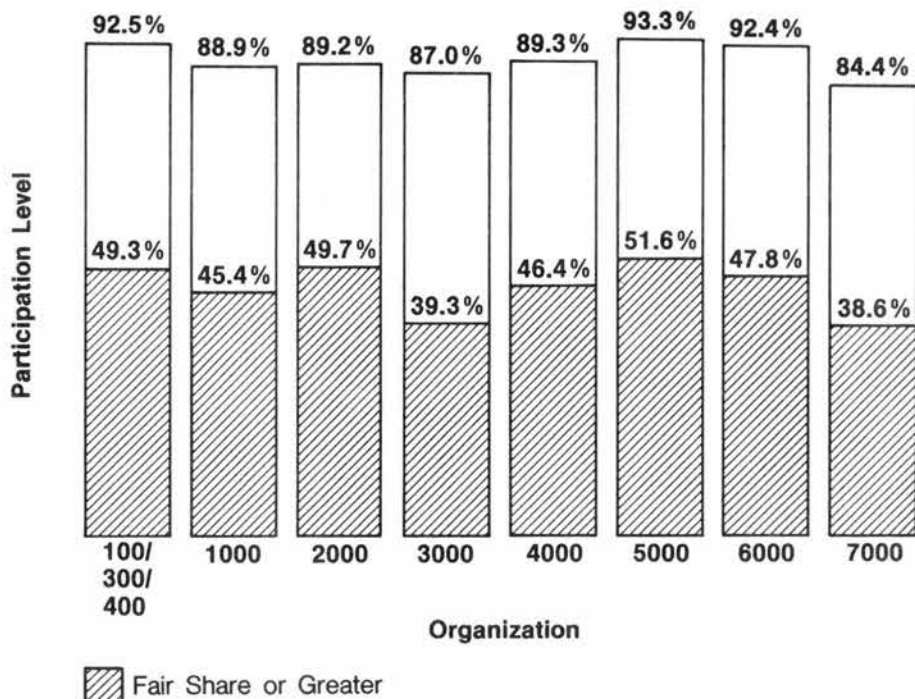


LOOKS LIKE A DOLLHOUSE, but it's more than that. The Albuquerque Rape Crisis Center uses it to gather information from a child about where and how a sexual assault occurred and to encourage an abused child to learn about healthy family roles. Here, ARCC Director Elena Avila and Bill Marshall (6250), 1985 Deputy ECP Chairman and 1986 Chairman, answer some questions about the new tool/toy. The dollhouse was purchased out of the ECP Reserve Fund, which earmarks one percent of the money raised through ECP for special purchases throughout the year. Grants ranging from \$150 to \$600 helped 29 organizations buy equipment in 1985.



1985 VERSION of Sandia's Employee Contribution Plan campaign was most successful — surpassed the goal, more than \$1 million pledged, highest ever participation level (88.6 percent). Among the many people who supported the campaign were Conrado Otero (7482; left), president of the local Metal Trades Council, and Jerry Garcia (153), president of the OPEIU, Local 251. Here they receive the Zia Award from United Way Campaign Chairman Bob Jancar. The Zia Award goes to companies whose employees' average gift is more than \$100 each; Sandians currently average \$152. The Sandia corporate contribution was \$100,000, earning the Labs a second Zia Award.

**ECP Participation 1985**



ECP KICKOFF featured a 50s theme: a "Happy Days" skit, starring members of top management, and a hula hoop contest and a dance contest with cakes baked by Sandia directors for the winners. This cake was more tasty than photogenic. United Way sponsored a community-wide contest among those promoting the campaign this year, and Sandia won many of the awards: an Excellent in graphics (posters, designed by Lynn Peters and Jan Gaunce, 3155); an Excellent in feature writing (LAB NEWS articles); a tie for Excellent in special events (ECP Kickoff, organized by Sieglinde Neuhauser, 6321, with skit written and directed by Bruce Hawkinson, 3162); a tie for Merit in special communications (letters and memos by Rod Geer, 3161); and an Excellent in training. The kickoff was videotaped by Motion Picture-Video Services Division 3153.





ONE OF THE FRINGE BENEFITS of being executive secretary of the ECP Committee is the chance to make friends in the agencies the ECP campaign supports. Here Julia Gabaldon [3523; left] enjoys some music at Share Your Care.

**'Call Me Hool-ya!'**

## Ms. ECP Moves On

Coach Gabaldon has moved on to new challenges, leaving a legacy of four years of successful campaigns against Sandians' wallets. But it's been the kind of peculation most of us are proud to be part of.

She's Julia Gabaldon, and she's been executive secretary of the Employee Contribution Plan committee since January 1982. In that role, she's been coach, sparkplug, catalyst, and "jill of all trades," in her words, for the committee's annual ECP fund-raising drives, which benefit the full spectrum of health and social service groups in the Albuquerque community. She recently transferred from Community Relations Division 3163 to Management and Staff Development Division 3523.

In looking back over her tenure with ECP, Julia recalls her first supervisor's advice on her assignment: "Keep it new, keep it fresh," said John Cantwell (then 3163, now Assistant to Executive VPs 20/30). "And that's just what I and the other committee members tried to do," Julia notes. "We had an 'Agency Fair' the first year, then a variety show, a country-western hoedown, and this year a 50s party, complete with hula hoops, dance contest, and a Happy Days skit.

"I've pushed for more and more employee involvement in the campaigns: Inform more people, excite more people — bottom to top — about the importance of ECP in building a better community. And we've proved, again and again, that Sandians really do care about their community."

One of Julia's innovations was to design a training program for directorate representatives that's led by Sandians. "The reps' message to their fellow troops is crucial," she notes. "If they do a good job, then we have assured a successful cam-

paign. Our program includes visits to the agencies providing services, and those visits invariably convinced even the reluctant directorate reps of the importance of their task.

"The reps and the other committee members invariably come to enjoy their



BASIC ENERGY SCIENCES Laboratory Program Panel, which held its semiannual meeting in Albuquerque in January, consists of representatives from the Washington office of DOE/BES and from each of the national laboratories. The BES program is one of the larger energy programs at Sandia: FY86 operating budget is \$6.9 million at SNLA, \$7.2 million at SNLL. Front row, from left: Mike Knotek (former Sandian), Brookhaven National Lab; James Coronas, Ames Lab, Iowa State University; Don Austin, Scientific Computing, BES; William Glass, Pacific Northwest Lab; Richard Gajewski, Advanced Energy Projects, DOE; Donald Stevens, Associate Director, BES; Fred Vook (1100); George Kwei, LANL; Frederick Koomanoff, CO<sub>2</sub> Research, BES; David Richman, BES. Back row, Elliot Pierce, Chemical Sciences, BES; Kenneth Kliever, Argonne; Kenneth Street, LLNL; Donald Feucht, Solar Energy Research Institute; Dan Hartley (8300); Louis Ianniello, Material Sciences, BES; Alex Zucker, ORNL; G. M. Rosenblatt, LBL; M. K. Wilkinson, ORNL.

ECP work; it provides a human element that makes their job well rewarded."

Julia also played a key role in another innovation — inviting United Way agency heads to Sandia so they could see the place and meet its people. "It gives the agency heads a chance to see where a million dollars comes from," says Julia. "And it helps to cement our relationship with the community."

That community involvement can be traced back to Sandia's early days, but (thanks to former VP Ray Powell and former public affairs department manager Ted Sherwin and several other Sandians) it became formalized as ECP in 1957; the first ECP campaign raised some \$100,000. In the years since, Sandians have contributed more than \$13 million to the community through ECP.

The ECP today is a mature, smooth-running operation, one of the nation's outstanding examples of corporate fund-raising. That success depends on people like Julia and a long string of hard-working, dedicated, and inspirational committee chairmen and executive committee members. During Julia's tenure on the committee, it's been headed by Glen Kepler (1810), Waylon Ferguson (3150), Ed Franzak (400), and Herb Pitts (then 3500); next year's chairman is Bill Marshall (6250).

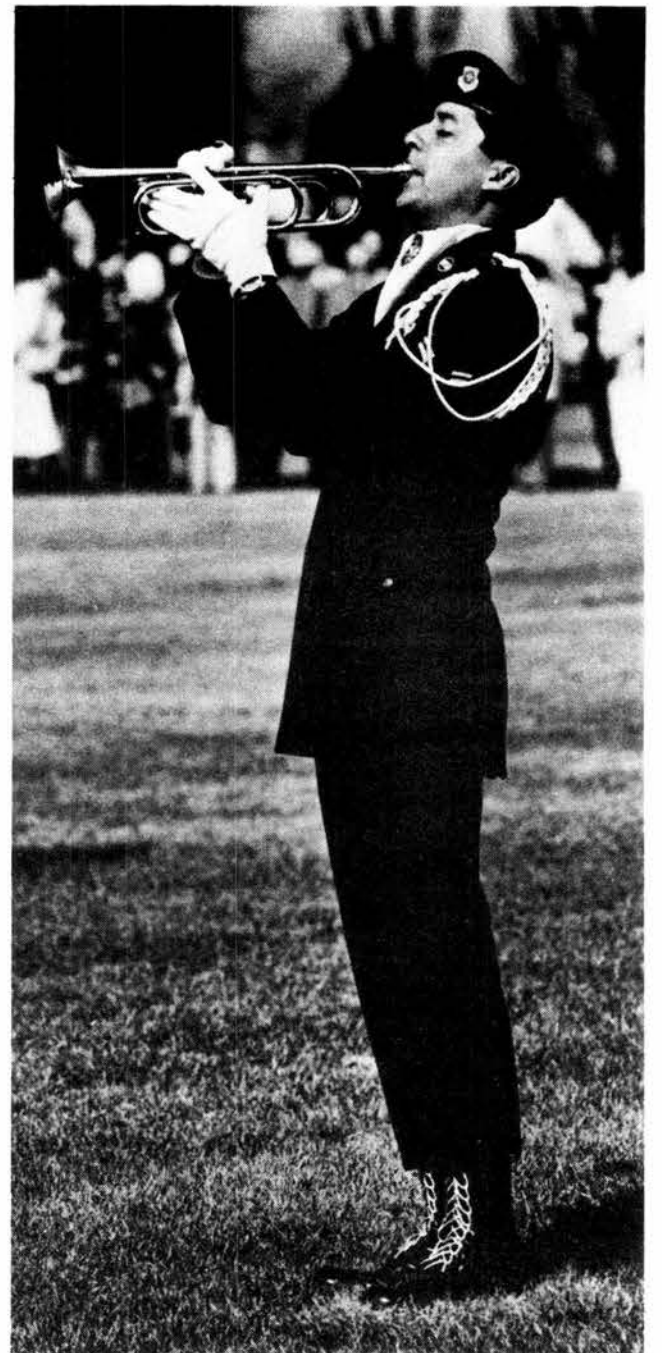
Part of the committee or not, Julia plans to continue her involvement with three of her favorite agencies: Shelter for Victims of Domestic Violence, Hogares, and Muscular Dystrophy.

"Those involvements are one of the spinoffs of my work on the committee," Julia concludes. "But beyond that, we — all of us working with ECP — have had fun. And that's really the secret of creating the enthusiasm needed to make the program successful."





## KAFB Ceremony Honors Challenger Astronauts



UNDER A FLAG at half-staff, Sandia and Kirtland people joined the nation in mourning the loss of seven astronauts in the Challenger tragedy. Ceremony in-

cluded honor guards, a 21-gun salute, a flyover, remarks by Lt. Gen. Ernest Hardin (ret.), and, finally, Taps.

## Events Calendar

*Feb. 14-15* — New Mexico Symphony Orchestra concert; Neal Stulberg, conductor; Harry Gorodetzer, cello soloist; 8:15 p.m., Popejoy Hall.

*Feb. 14-23* — "Twelfth Night," New Mexico Repertory Theatre; 8 p.m. Wed. through Sat., 2 p.m. matinees Sat. and Sun.; KiMo, 243-4500.

*Feb. 16* — UNM Symphonic Wind Ensemble concert; Harold Van Winkle, director; 4 p.m., free admission, Keller Hall.

*Feb. 17* — Recital concert; Neal Stulberg, piano; Harry Gorodetzer, cello; music of Brahms, Sammartini, Beethoven, Faure, Prokofiev, and Weber; adults \$3, students and senior citizens, \$2; 8:15 p.m., Keller Hall, 842-8565.

*Feb. 18* — Albuquerque Jazz Orchestra; Pancho Romero, conductor; Keith Lemmons, clarinet soloist; 8:15 p.m., Keller Hall.

*Feb. 21-23* — Shrine Circus, Tingley Coliseum, 883-4040.

*Feb. 21* — "Choralfest;" New Mexico Symphony Chorus, UNM Chamber Singers, Chorus of Santa Fe (music of Effinger, Ives, Schoenberg, Lotti, Davis); Roger Melone, conductor; 8:15 p.m., First United Methodist Church, 842-8565.

*Feb. 21-23* — 27th Annual New Mexico Sports Show; Fri. 6-10 p.m., Sat. 11 a.m.-10 p.m., Sun. 11 a.m.-8 p.m.; Convention Center.

*Feb. 22* — Folk music concert (featuring Holly Near, Ronnie Gilbert, and friends),

sponsored by UNM Women Studies Program, 8:15 p.m., Popejoy Hall, 277-3854.

*Feb. 22* — Concert; Artemus Edwards, bassoon; Arlette Felberg, piano; 8:15 p.m., Keller Hall.

*Feb. 23* — David Copperfield (magician), UNM Cultural Program Series, 4 p.m. and 8:15 p.m., Popejoy Hall.

*Feb. 23* — The Waverly Consort (country's longest established early music ensemble), 4 p.m., First United Methodist Church, 243-5646.

*Feb. 23* — "Happy Birthday, Mr. President," New Mexico Symphony Orchestra (Copeland's "Lincoln Portrait," with narration written by Carl Sandburg; other musical selections); \$2 adults, \$1 children; 7:30 p.m., KiMo, 842-8565 or 848-1374.

*Feb. 24* — Showtime at the KiMo: "Ain't Misbehavin'" (1978 Tony award for best musical), 8 p.m., KiMo, 848-1374.

*Feb. 26* — Senior Citizens Talent Show, sponsored by Office of Senior Affairs, 2 p.m., KiMo, 345-5654.

*Feb. 26* — "Comets & Dinosaur Extinction," NM Museum of Natural History lecture by Jack Burns, admission by donation, 7 p.m., KiMo.

*Feb. 27-March 8* — "Dance on the Loose" (flamenco, ballet, and modern dance); 8 p.m. Feb. 27-28, March 1, 6, 7, 8; 2 p.m. matinee March 1; Rodey Theatre, 277-4402.

*Feb. 28* — "Showfest 86," regional competi-

tion for junior and senior high school show choirs; co-sponsored by UNM and the NM chapter of the American Choral Directors' Association; all day, Keller Hall.

*Feb. 28-March 2* — "The Marriage of Figaro," performed in Italian by the UNM student opera department with the UNM Symphony Orchestra; Marilyn Tyler, director; 8 p.m. Fri.-Sat., 4 p.m. Sun.; Popejoy Hall, 277-3121.

### Sympathy

To Laudente Montoya (7818) on the death of his brother in Albuquerque, Jan. 19.

To Dick Shaum (7556) on the death of his mother in Las Cruces, Jan. 27.

To Fidel Carrillo (7474) on the death of his father in Belen, Jan. 27.

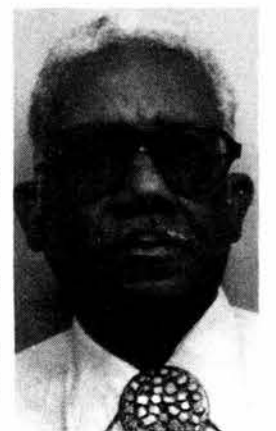
To Marv Torneby (3530) on the death of his father in North Dakota, Jan. 28.

### Death

Edward Edghill of Custodial Division 3426 died after a lengthy illness Jan. 28. He was 57.

He had worked at the Labs since July 1984.

Survivors include two daughters, two sons, and his mother.





**The Snow That Kills**



"While snow is beautiful, it can also kill. Those white streaks [on a mountainside] are avalanche trails. Already this year 26 people have died in avalanches in the Swiss Alps. The worst year recently was 1951, when 98 people perished, most of them when tons of snow crashed down the slopes and inundated their villages in the valley below. 'We have been able to decrease the danger by a factor of 10, but there is still an awful lot we don't know about snow,' says Claude Jaccard [Swiss Federal Inst. for Snow & Avalanche Research]. There is a lot of room inside a snowpile, which is three-quarters air and one-quarter ice. All of the freezing, melting and changing shapes lead to instability, movement and avalanches. Jaccard and his staff of 31, perched [in Weissfluhjoch], 8,737 feet above sea level, measure snow's water content. Using remote microphones, they listen to snowdrifts for sounds that indicate that the underlying snow may be ready to shift. They also slice snow blocks into thin sections and analyze the blocks' structure on a computer. They throw snow down a chute to simulate little avalanches. They design and test fences to stop the snow. And some 60 volunteers, including a priest in the hospice at Grand St. Bernard, telex in reports on conditions every morning, which are assembled into avalanche warnings." Philip Revzin, *Wall Street Journal*



"ROCK STAR," the creation of Susan Navarro (2822), picked up the STONY award for "Best Actress" in the First Annual Mineral Spirits Show (LAB NEWS, Jan. 17.) STONYs were given in eleven different categories, including humanitarian, medical, and archaeological recognition, as well as one for the most "prolithic, compulsive competitor." A complete list of winners is posted at the show in Bldg. 830. The show will run for one more week (through Feb. 21). When it closes, curator Janet Jenkins (3155) reminds represented artists to pick up their entries and start thinking about next year!

**UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS**

**Deadline: Friday noon before week of publication unless changed by holiday. Mail to: Div. 3162.**

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2. Include organization and full name with each ad submission.
3. Submit each ad in writing. No phone-ins.
4. Use 8 1/2 by 11-inch paper.
5. Use separate sheet for each ad category.
6. Type or print ads legibly; use only accepted abbreviations.
7. One ad per issue per category.
8. No more than two insertions of same ad.
9. No "For Rent" ads except for employees on temporary assignments.
10. No commercial ads.
11. For active and retired Sandians and DOE employees only.
12. Housing listed for sale is available for occupancy without regard to race, creed, color, or national origin.

**MISCELLANEOUS**

Hi-Fi, Fisher 500, AR-2 speaker, Gurrard-88 changer, mahogany custom cabinet. Hayes, 299-1200.  
 ELECTRONICS BOOKS, large selection, hardbacks, reasonable prices. Earley, 296-7383.  
 MOVING BOXES, wardrobes, dishpaks, books, and miscellaneous, cheap, also good for storage. Carter, 293-6750.  
 RV TIRES, three LR78-16, one H78-16, \$12 each; misc. 15" tires. Bentz, 299-3448.  
 19" SYLVANIA COLOR TV, \$125; 13" Sylvania Color TV, \$150; fluorescent desk lamp, \$10; mini cassette recorder, \$30. Bailey, 268-8079.  
 REFRIGERATOR, \$85; living room chair, \$75. Falacy, 293-2517.  
 CARD TABLE, Formica, 42" round w/12" leaf and 4 upholstered chairs, \$50; folding ping-pong table, 3/4" top, \$30. Troum, 292-1783.  
 SNOW THROWER, 5-hp, electric starter, best offer; Coldspot freezer, white, 16 cu. ft., upright, \$95. Neal, 299-4956.  
 CAMPER SHELL, Winnebago, fiberglass, w/or w/o sliding bed; folding trailer, sleeps 8, stove, sink, electrical converter. McGuckin, 299-1342.  
 GRO-LIGHT, 48" long fixture w/reflector, two 40-watt Gro-Lux fluorescent tubes, \$15. Schkade, 292-5126.  
 HOTPOINT electric kitchen range; apartment size gas range; wet bar; tilt-table saw; Datsun pickup shell. Houghton, 299-3386.  
 CLASSICAL GUITAR, Pimentel, new cost \$350, make reasonable offer. Arana, 299-1214.  
 POOL TABLE, \$125; four louvered doors, walnut stain, 80"x18", \$25 each; sleeper sofa, \$95; porch swing; draperies, green. Magnuson, 821-5330.  
 WINDSURFER, Alpha, 12-ft. double-concave PE hull, 190 liters, vario-

boom/mast, retractable CB, footstraps, 5.5m<sup>2</sup> mylar full batten sail. Ritchey, 268-7620.  
 25" COLOR CONSOLE TV, 1976 Motorola, pecan cabinet, \$75; Roger de Coster dirt bike, \$135. Hill, 293-3582.  
 STOVES: Kenmore electric, continuous clean, coppertone, \$250; Kenmore gas (bottle or natural), \$50. Dotts, 294-8297.  
 BEVELED-EDGE GLASS DINING TABLE, 42"x72", brass pedestal base, 4 matching camel upholstered chairs, \$800, American's price \$1000. Lopez, 242-7001.  
 APPLE 2E COMPUTER SYSTEM, 128K, dual disk drives, assorted hardware and software, \$1200. Caffey, 296-3320.  
 MICROPHONE, Shure, \$30; 12-string guitar, Alvarez, new strings, w/case, asking \$120. Marquez, 344-8455.  
 FOUR-DRAWER CHEST, \$150; old Singer sewing machine, \$25; phonograph stand, \$50; Porta-Potti, \$350; antique loveseat. Blechinger, 299-4890.  
 25" TV, SEARS console, needs work, \$50. Ishimoto, 821-6518.  
 ROSSIGNOL SKIS, 3 pairs, 160cm w/202 Solomon bindings, 160cm w/444 Solomon bindings, 175cm w/202 Solomon bindings, \$30 each OBO. Bland, 265-6286.  
 25" COLOR TV, w/outside antenna, \$100; gun cabinet, lockable doors/drawer; pistol cabinet, glass doors, both \$100; (all 3 Early American). Edmund, 881-7974.  
 RICKENBACKER 4001 BASS, natural finish, stereo output, case, \$350; Moog Taurus bass pedals, good for one-man band, \$300. Miller, 296-8724.  
 COMPUTER, Franklin 1000 (Apple clone), 2 drives, modem, CPM, 80-column, screen, paddle, \$1000 of programs, best reasonable offer. McCaughey, 268-6855.  
 .17-CALIBER CUSTOM VARMINT RIFLE, heavy barrel, bird's-eye maple stock, 3X9 scope, w/brass for reloading, \$325 OBO. Dodson, 1-832-6950.  
 UNMOUNTED STEREO SPEAKERS, Electrovoice SP12B, 16-ohm, two-way, 30 watts average, 30-11,000 Hz, 12", barely used, new \$220/pr., want \$100/pr. Blake, 881-1663.  
 CUE STICK, McDermott, new, D-21, retail \$310, sell for \$250. Zownir, 256-3753.  
 SEARS BEST GAS SHOCKS; fit front of '82/'83 Ford E-150 or F-150, new in boxes, \$35. Jones, 299-1954.  
 GAS OVEN, Chambers, working condition, \$25. Hughes, 265-1698.  
 SHELVES, open Spanish styling for books/display, covers 6' x 6' wall area, heavy wrought iron supports, \$30. Rainhart, 821-3690.  
 SKI BIBS for medium youth, age 9-11, Aspen brand, black, one season's use, \$12. Perrine, 293-1429.  
 13 NEW CREAM OPENWEAVE SHEERS, 80" long, 4 84" long; 2 brass traverse rods open to 100"; 3 mirrors, 8" x 90". Bronkema, 821-2119.  
 AKC DACHSHUND PUPPIES and AKC Siberian Husky puppies (blue eyes). Puccini, 255-0568.

BROWN CARPET w/padding, 11' x 11', \$50. Benton, 877-2473.  
 STEREO CABINET, Mediterranean, 20" x 80" x 18"; Monterey gas wall heater, 16" x 66" x 8"; portable electric heater; misc. recessed Lightolier light fixtures. Ferguson, 266-4769.  
 MOBILE HOME AXLES (3), \$75 each or 3 for \$200 OBO. Stevens, 869-3622.  
 DINING TABLE/CHAIRS, solid oak, extends to 10', \$2000 value, \$1200. Kramer, 883-0574 mornings before 7:30.  
 EXCEL BRUTUS INCLINE WEIGHT BENCH, 2000-lb. capacity w/160 lb. Weider weights, leg lifts, squat rack, arm curl, \$350. Bugos, 892-3579.  
 3 SOFAS, red print, black vinyl, gold plush, \$90 each; green recliner, \$75. Torres, 299-5789.  
 TRIPLE DRESSER w/two mirrors, dark wood w/brass hardware, \$100. Dickenman, 892-0503.  
 GARAGE DOORS, 8' x 7', \$30 each. Kelly, 884-4443.  
 USED CARPET, reddish-orange, 20.4 sq. yds., \$60. Tripp, 822-8580.  
 SUZUKI VIOLIN, 4 years old, used one year, \$315 new, sell for \$225. Sanders, 298-4194.  
 POOL PLANTS: water lilies, water hyacinths, water iris, potted, \$5 each, bare root, \$3 each. Atkins, 298-5762.  
 DRAPES, formal, gold, 2 sets w/sheers and rods, 97"W x 92"L and 149"W x 92"L. Baney, 294-8970.  
 SECRETARIAL DESK, \$200; Hazeltine 1500 terminal, \$200; S100 TEI microcomputer mainframe, 12 slots, \$175. Jones, 296-1755.  
 SLIDE MOUNT CB RADIO, Realistic 40-channel w/two mounts, RF gain, PA, 9-ft. antenna w/mount, \$55. Nickerson, 299-3101.  
 COMPUTER MONITOR, Amdek + 14", color composite, one year old, \$250. Person, 822-0625.  
 SWIVEL ROCKER, high back, light olive green velvet, \$35; small doghouse, suitable for indoors or outdoors, \$10. Caskey, 296-6372.  
 DAYCARE, my home, Heritage Hills, prefer toilet-trained girl for playmate for my granddaughter. Martinez, 821-4571.

**TRANSPORTATION**

'82 BMW R100RS, two seats, custom paint, many extras, \$3500; '76 Moto Guzzi SP1000, 20K miles, \$1500. Bailey, 268-8079.  
 '78 OLDS Delta 88, 2-dr. coupe, 83K miles, Class II hitch, 350 engine, stereo cassette, cruise control, etc. Rose, 299-9333.  
 '79 VW convertible, last of the German imports, new top, 35K miles, \$6500 OBO. Elliott, 299-2782.  
 '74 VOGUE 28-ft. RV, Dodge 440, cruise, tilt steering column, 6.5-kW generator, dual AC, sleeps 7. Bourgeois, 298-2346.  
 '81 YAMAHA 550 SECA MOTORCYCLE, Blue Book \$1235, first \$600 takes. Muirhead, 281-2925.  
 GIRL'S 20" Schwinn bicycle, \$50. Wowak, 298-9398.  
 '82 VW Scirocco, 5-spd., AC, AM/FM cassette, alloy wheels, tinted windows, new radials, \$5300. Kelly,

281-9774.  
 '77-78 BUICK Century, original owner, PS, PB, lifetime guaranteed transmission, \$3000. Porter, 255-8495.  
 '73 VW bus, pop-top camper, new clutch, exhaust, brakes, battery, tires, \$3500 OBO. Austin, 898-4050.  
 '85 MERCURY Topaz, AT, AC, cruise, AM/FM cassette, 2-dr., \$7000. James, 296-3597.  
 '82 SUBARU GL, 4WD stn. wgn., 65K miles, 15K on motor, AC, AM/FM, \$5000. D'Spain, 865-6817 after 6 or weekends.  
 '74 CHEV. Nova, completely overhauled motor, rebuilt transmission, new brakes, upholstery and paint, \$2000. Montoya, 296-9117.  
 CHEV. Caprice, 4-dr., AT, PS, PB, AM/FM, AC, power seat, \$850. Padilla, 884-4913.  
 '84 NISSAN 300ZX, power option, AM/FM cassette, new battery, tires, 50th anniversary edition, under retail. Yoder, 294-3875.  
 '77 DODGE Aspen stn. wgn., 69.5K miles, new tires, battery, radio, brakes; AT, AC, \$1400. Sellers, 292-0466 after 5.  
 '70 LAND-ROVER 4X4, all manuals, spare engine, 93K miles, \$1500 OBO. Goodrich, 299-6684.  
 '74 CORVETTE 350, AT, PS, PB, PW, AC, uses regular gas, asking \$7500. Gentry, 298-3574.  
 '85 HONDA CRX Si, metallic black, power sun roof, AM/FM cassette, 6K miles, \$8200. DiBisceglie, 294-7790.  
 '70 CADILLAC El Dorado, \$1000 OBO. Tafoya, 299-5035.  
 VAN, 12-passenger, original owner, low miles, dual AC, cruise, tilt, gages, AT, PS, PB, 36 gal., \$3900. Atkins, 298-5762.  
 '77 OLDS Cutlass Supreme, AT, AC, PS, PB, AM/FM cassette, \$1800. Finley, 293-8611.  
 '82 FORD Escort, 4-dr. hatchback, 4-spd., AC, 29K miles, \$3500. Reilly, 821-6195.  
 '84 KOMFORT 22' travel trailer, used only twice, \$11,470. Tuck, 292-1054.  
 CUSTOM SHOW BIKE, '71 Triumph, low miles, 650cc, fully molded titanium frame, rest chrome, stainless and polished aluminum, \$4500. Sanders, 298-4194.  
 '79 CAMARO, 6-cyl., 3 spd., new brakes, clutch assembly and shifter, etc. Dickenman, 892-9561.  
 '70 BUICK Skylark, 2-dr., 350 CID, AT, \$600 OBO. Still, 883-8159.  
 '77 OLDS Delta 88, 4-dr. sedan, fully equipped. Brewster, 898-0144.  
 '80 FORD pickup w/cap, long bed, 6-cyl., 4-spd., AC, 72K miles, \$4200. Lukens, 299-1271.  
 BICYCLES, two 10 spd., 24" frames, Columbia Chargers, \$60 each, negotiable. Baney, 294-8970.  
 '82 VIRAGO XV750J, one-year factory warranty, 6K original miles, headers and Bell helmet, \$1600. Oravec, 281-3667.  
 '84 FORD Ranger, 4-cyl., 4-spd. + overdrive, AM/FM, fiberglass cap, good tires, 26K miles, \$5900. Foltz, 291-0051.  
 '82 FIREBIRD, metallic brown, AT, AC,

PS, PB, V8 350, tilt wheels, cruise control, radials, 38K miles, \$7200. Nickerson, 299-3101.  
 '79 FORD F100, 64K miles, new tires, brakes, shocks, LWB w/camper shell, \$3500 OBO. Erwin, 836-2746.  
 BICYCLES, Raleigh 23" men's frame, Centurion women's 19" Mixti frame, 12-spd., \$200 each OBO. Vigil, 869-6870.  
 '71 MAVERICK, 6-cyl., 200 CID engine, one owner. Johnston, 299-1830 or 294-6831.  
 '78 MAZDA GLC hatchback, 4-cyl., 4-spd., AC, 73K miles, \$1000. Detry, 821-9437.  
 '74 JAGUAR XJ12L sedan, 12-cyl., power/luxury, yellow/tan leather, \$7000. Ewing, 268-6920.  
 '78 PONTIAC BONNEVILLE Brougham, 4-dr., PS, PB, AC, tilt, velour interior, low mileage, \$2400; '77 Olds 98 Regency, 4-dr., AC, loaded, \$1500 OBO. Russell, 298-8879.  
 '73 CADILLAC DeVille sedan, all options, new paint, 90,000 miles, \$1,500. Mauney, 822-0250.

**REAL ESTATE**

CEDAR CREST, '83 14' x 64' mobile home, 2-br., 1-1/2 bath, set up in adult section mountain park, \$19,500. Helling, 281-5536 or 345-0678 after 5.  
 '84 14' x 66' mobile home, wood siding exterior, 2-bdr., 2 baths, never lived in, vaulted ceilings, \$17,500 negotiable. Murillo, 877-1465.  
 SOUTHWESTERN STYLE 3-bdr. home, 1500 sq. ft., paneled great room, fireplace, landscaping, Taylor Ranch, \$84,500. Hosking, 898-3369.  
 5-BDR. HOME, close to Sandia, formal dining room, large den, carport, etc. Stromberg, 255-6131.  
 2-BDR. TOWNHOUSE in NE heights, new carpet, linoleum, entry tile, landscaped backyard, fruit trees, garden area, \$59,000. Donham, 299-6224.  
 3-BDR. MOUNTAIN HOME, 2600 sq. ft., 1400 sq. ft. outbuilding, community water, all-weather access, 3-car carport, one wooded acre. Young, 294-6228.

**WANTED**

RENTAL HOME, new hire arriving March 1 to rent for approx. one year, two adults, one dog, like Cedar Crest area. Washburn, (201) 464-7924.  
 AIRPLANE OWNERS to form partnership to build multi-unit T-hanger. Roeske, 292-3740.  
 CHILD CARE for infant, Indian School/Tramway area, prefer retiree or Sandia wife, start March 3. Stephenson, 836-3135.  
 DATSUN PICKUP BODY PARTS, '69-'73, front fender (passenger) and bumper, Model 521, in reasonable shape, will remove. Blake, 881-1663.  
 UNIVERSITY SPEAKER SYSTEM, large cabinet type, 50 watts. Zownir, 256-3753.  
 SCHWINN Air-Dyne exercise bicycle. Hughes, 265-1698.



# Sweetheart Dance Tomorrow Night

VALENTINE'S DAY is today, but the Sweetheart Dance tomorrow night turns it into a two-day celebration. A buffet from 6-9 features BBQ ribs or chicken, baked beans, coleslaw, and a bunch of other goodies, all for \$6.95. The big-band sound of Don Lesman and his group from 8-11:30 will put you in that romantic mood—the "in" way to be this time of year. Make those reservations right now with the Club office.

MEANWHILE, START the Valentine celebration tonight with the two-for-one dinner special. It's filet mignon or scallops (two dinners for a measly \$14.95) and the ever-popular Isleta Poor Boys are back after a month-long absence to entertain with c-w music.

T-BIRD CARD SHARKS, your last chance in February to hone that shuffle is next Monday, Feb. 17. It all happens in the Eldorado room, starting at 10:30.

CORONADO SKI CLUB members get together next Tuesday, Feb. 18, at 7 p.m. in the ballroom for ye olde monthly meeting. Folks from Telluride will be on hand to talk about improvements at the ski area and Telluride's summer program, including the infamous wine fest and bluegrass weekend. More fabulous door prizes than ever before, reports honcho Steve Ross (1000). Ski trips the rest of this month include Feb. 21-26, Steamboat; Feb. 22, Angel Fire; and Feb. 23, Taos.

SINGLES, it won't be Valentine's Day on Feb. 20, but who knows? Don't miss the next Single Mingle at the Club next Thursday right after work. Bargain prices on those two favorites, draft beer and margaritas,

and lots of munchies too. Soundwave provides the music from 5-10.

A WEEK FROM TONIGHT, stoke up at the C-Club buffet featuring either Baron of Beef or halibut steak at the special price of \$6.95. Night Rider (how's that again?) will have you cantering around the ballroom with its country-western offerings.

A GENERAL MEETING for Thunderbirds is scheduled Monday, Feb. 24, at the Club from 2-5 p.m. Come on out and let the group know what kind of activities turn you on (careful, now!). We don't know what goes on at a three-hour meeting, but you can probably count on some monkey business thrown in with the general business.

THE FIRST ONE was such a success that another Sunday brunch/dance is on tap for the Thunderbirds on March 2. Again, a terrific brunch buffet will be served from 11 a.m.-2 p.m., and those wizards of "old smoothie" sound, the Rhythmaires, will be on hand for your dancing and listening pleasure from 1-3. Any C-Club member is welcome at T-Bird activities, says Charlie Kaspar, Thunderbird honcho and original old smoothie.

TRAVEL—Don't miss out on these three get-away-from-it-all trips coming up in March/April/May:

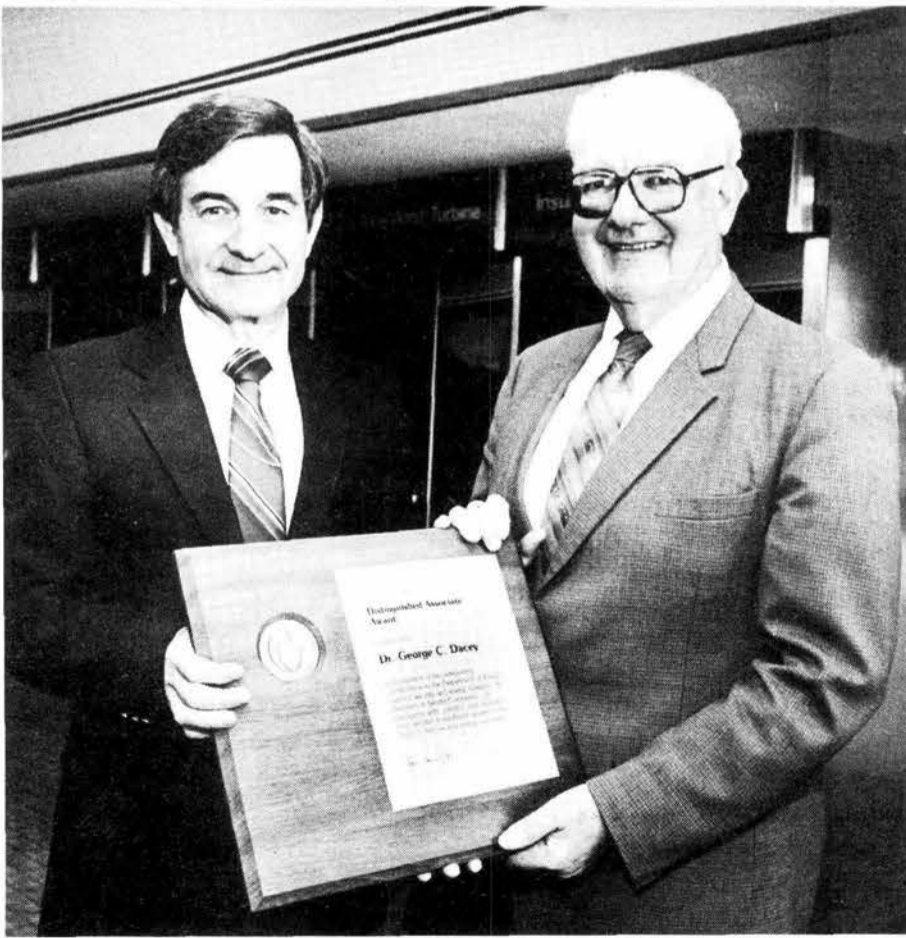
**Rainbow Bridge/Grand Canyon**—A four-day bus trip March 22-25 takes you to Lake Powell and the Grand Canyon. You'll visit Rainbow Bridge National Monument via a boat cruise on Lake Powell and then head for Grand Canyon. The \$173/person tab covers charter bus round trip, two nights' lodging at Wahweap Marina on Lake Powell, all-day boat cruise to Rainbow

Bridge (lunch included), a stop at Lee's Ferry in Marble Canyon on the Colorado River (the starting place for many a raft trip), west and east loop tours of the Grand Canyon's south rim, one night at the Thunderbird Lodge on the Canyon rim, and snacks and drinks on the bus every day.

**Las Vegas**—Another great bus trip to wild and wicked Las Vegas is scheduled April 20-23. T-Bird card players, take advantage of this one; after all your practice, you'll be able to figure out those LV dealers every time! For \$122/person you get round trip on the bus, three nights at the Maxim Hotel in LV, some meals, a tour of Hoover Dam, a stop at Sam's Town (who he?) in Laughlin, Nev., and the usual snacks and drinks on the bus throughout the trip.

**Carlsbad Caverns New Cave/Old Cave and El Paso/Juarez**—OK, you spelunkers, here's your chance! Not only can you experience the wonders of the Carlsbad Caverns we all know and love (old cave), you can also explore Carlsbad's undeveloped new cave on this super bus trip May 9-11. The C-Club has reserved all 25 spaces on the May 11 new cave tour; carry your own flashlight and navigate between levels via ladders. (The new cave tour is ranger-guided, by reservation only.) Those with an aversion to ladders or to changing flashlight batteries may tour the Living Desert State Park or join the R&R group at the hotel. The return trip to ABQ makes an overnight stop in El Paso, with a Juarez shopping spree thrown in. A bargain at \$108/person.

Call the friendly reservation takers at the Club office to sign up for any or all of these trips. They're already filling second buses on the Rainbow Bridge and Las Vegas jaunts.



IT WASN'T a totally solemn occasion (see below) as outgoing President George Dacey departed Sandia last month. But the DOE Distinguished Associate Award, presented by AL Manager Ray Romatowski, cited George's "outstanding contributions to the DOE's national security and energy missions" and noted that "his managerial skills, initiative, and dedication have resulted in significant benefits to the Nation's defense and energy well-being."



PRESIDENT-ELECT of NAMEPA (National Association of Minority Engineering Placement Administrators), Nathaniel Thomas, presented a workshop last month on recruiting and retaining minority employees. Goals of the workshop were to familiarize Sandia recruiters with NAMEPA and its minority programs in 80 major engineering schools, to develop ideas on effective minority recruiting and retention practices, and to develop and maintain a positive relationship with minority engineering program administrators. During his visit to Sandia, Thomas also toured the Labs and met with staff and management of Personnel.



**Another Murphy?**

The First Law of Air Travel reads: "The proximity of a screaming child to you in an airplane will be directly proportional to the impor-

ance of the highly technical reading material you must fully digest for a crucial business meeting at your destination."

Michael Rosen, *Wall Street Journal*

